

Line X tester analysis for root characteristics in selected hybrid rice combinations

W.S. Priyantha¹, V.A. Sumanasinghe^{2*} and D.M.O.K.B. Dissanayake¹

¹Rice Research and Development Institute, Ibbagamuwa, Sri Lanka, ²Faculty of Agriculture, University of Peradeniya, Sri Lanka

*sajanas@pdn.ac.lk

Twenty five F1 hybrid rice combinations were produced using five Cytoplasmic Male Sterile (CMS) Testers (IR68902A, IR70369A, IR68902A and IR78354A) and, five Restorers (Lines) R147(IR72998-93-3-3-2R), R156(IR73885-1-4-3-2-1-10R), R317(IR183325-66-2-1-NPT), 160(IR75282-58-1-2-3), SN10-2071 following the line x tester mating design. The 25 cross combinations and the ten parents were tested for root traits which have a strong bearing on the final yield in Maha 2014/2015 and Yala 2015 seasons at the Rice Research and Development Institute, Batalagoda, Ibbagamuwa, Sri Lanka. The objective was to study the influence of hybrid combinations on root volume and root dry weight, through Line x Tester analysis.

Analysis of variance for root volume/plant (RV/P) indicated that all the genotypes: parents, lines and crosses were significantly different at 1% probability level. Parents, crosses and lines were significantly different among themselves at 1% probability level for root dry weight per plant (RDW/P) as well. However, testers showed significant differences only at 5% probability level for root dry weight. Three way interaction (Line x Tester x Season) was also found to be significant for root volume and root dry weight at 1% and 5% probability level, respectively.

According to the response curve analysis, in both Yala and Maha seasons, the Tester 30 (IR 78359A) had the highest average performance. Tester 29 (IR 78359)/ Line 3 (IR183325-66-2-1(NPT)) was the best specific hybrid combination for the root volume in both seasons. In the Maha season, performances of different testers with different lines appeared highly unpredictable with respect to root dry weight per plant. However, cross combination [IR68902A/IR75282-58-1-2-3(R160)] was the specific combination which produced high root dry weight per plant. The combination Bg CMS 4A/ line 3 [IR 183325-66-2-19NPT] was identified as the best combination in Yala season with respect to root dry weight per plant.